Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) An image processing system, for correlating shapes in multi-dimensional images **(m-D)**, comprising image data processing means for estimating a similarity measure including computing means for:

estimating two image signals ($\mathbf{f}(\underline{\mathbf{x}})$, $\mathbf{g}(\underline{\mathbf{y}})$) representing shapes defined in respective windows (**W1**, **W2**) in two multi-dimensional images;

using a Hermite Transform (**HT**) applied to both said image signals for performing an evaluation of two first sets of scalar valued Hermite coefficients ($\mathbf{f}_I$, $\mathbf{g}_I$, $\mathbf{F}_I$, $\mathbf{G}_I$), from which a combination yields a transformed set of scalar valued Hermite coefficients $\{\mathbf{K}_I\}$;

applying the inverse Hermite Transform ($\mathbf{HT}^{-1}$) to the transformed set of scalar valued Hermite coefficients $\{\mathbf{K}_I\}$ to achieve the computation of a windowed correlation function ($\mathbf{K}(\underline{\mathbf{v}})$);

and estimating the maximum of said windowed correlation function as the ~~wanted~~ similarity measure to correlate the shapes; and

means for displaying the correlated shapes and/or processed images.

2. (Currently amended) The system of Claim 1, comprising data processing means for ordering the scalar valued Hermite coefficients ($\mathbf{K}_I$, $\mathbf{f}_I$, $\mathbf{g}_I$) in such a way that low-order coefficients code ~~the~~ coarse shape information whereas ~~the~~ high order coefficients code fine ~~details~~shape information.

3. (Currently amended) The system of one of Claims 1 or 2, wherein ~~the~~ a class of simultaneous transformations, which is dealt with for any data dimension m, comprises:

translation~~,~~ and a scale-change.

4. (Currently amended) The system of ~~one of Claims 1 to 3~~claim 1, wherein the class of simultaneous transformations, which is dealt with for data dimensions higher than 1-D, comprises:

translation, scale-change, and, in addition rotation and anisotropic scale change.

5. (Original) The system of Claim 4, comprising, for a number of variables superior to one corresponding to data dimensions higher than 1-D, data processing means for:

processing the first two sets of scalar valued Hermite coefficients ($\mathbf{f}_I$, $\mathbf{g}_I$) by applying at least one rotation matrix (**R1**, **R2**) which converts at least one of said two sets of scalar valued Hermite coefficients ($\mathbf{f}_I$, $\mathbf{g}_I$) into a new set of scalar valued Hermite coefficients ($\mathbf{F}_I$, $\mathbf{G}_I$) corresponding to a rotated version of at least one of the shapes;

estimating a transformed set of scalar valued Hermite coefficients $\{\mathbf{K}_I\}$ from the new sets of scalar valued Hermite coefficients ($\mathbf{F}_I$, $\mathbf{G}_I$) corresponding to the rotated versions of the shapes.

6. (Currently amended) The system of ~~one of Claims 1 to 5~~claim 1, comprising data processing means for:

setting the number of scalar valued Hermite correlation

coefficients $\{K_I\}$ to use and the set of translation parameters ($\underline{v}$) for which the correlation function ($K(\underline{v})$) is to be computed in order to provide a desired accuracy, according to which for a coarse estimate of only low order indices (I) and a limited number of sampling points for translation parameters ($\underline{v}$) are used, while the maximum value of the correlation function ($K(\underline{v})$), among all calculated values, provides the correlation measure and the corresponding optimum translation parameter ($\underline{v}$).

7. (Original) The system of Claim 6, comprising data processing means for:

setting the number of scalar valued Hermite correlation coefficients $\{K_I\}$ to use, when only translations in the direction defined by a given co-ordinate number (n) is involved, comprising limiting said evaluations of scalar valued Hermite correlation coefficients $\{K_I\}$ to multi-indices $I=(i_1,\ldots,i_m)$ for which $i_k=0$ for all co-ordinate numbers $k \neq n$, wherefrom computing a one dimensional correlation function ($K(v_n)$) depending on the one dimensional co-ordinate (v_n) of the m-dimensional translation parameters ($\underline{v}$).

8. (Original) The system of Claim 4, comprising computing means for estimating scaling factors from the estimation of the Hermite coefficients (F_I, G_I) by defining a quadratic difference measure (D) based on said Hermite coefficients (F_I, G_I) and choosing the scale-factors (z_k , z'_k) as the combination that minimizes this quadratic difference measure.

9. (Currently amended) The system of ~~one of Claims 1 to 8~~Claim 1, comprising data processing means for:

repeating the steps of determining the correlation function, as many times as necessary in order to reach ~~the~~ a best possible correlation function by modifying the rotation matrices ($\mathbf{R}_1$, $\mathbf{R}_2$), the scaling factors ({ z_k }) and by increasing the number of indices (**I**) if more accuracy is needed.

10. (Currently amended) The system of ~~one of claims 1 to 9~~Claim 1, comprising data processing means for performing an evaluation of a warping law for correlating a first and a second complex shape in multi-dimensional images (m-D), including ~~the~~ a determination of more than one window (**W1**) for the first shape and the determination

of corresponding candidate windows (**W2**$_k$) for the second shape, and further comprising data processing means for performing the estimation of the Hermite Transform (**K**$_I$) for the evaluation of a windowed correlation function **K(v)**, including steps of using a Hermite Transform (**HT**) of two image signals (**f(x), g(y)**) defined in respective windows (**W1, W2**), wherefrom data processing means for performing an evaluation of the inverse Hermite Transform (**HT**$^{-1}$) to achieve the computation of said windowed correlation function (**K (v)**), which is used to determine the best candidate windows, and comprising data processing means for performing the determination of the best warping law by iteration of these steps in order to match the first and second complex shapes.

11. (Original) An image processing method comprising an evaluation of a Hermite Transform (**K**$_I$) for the evaluation of a windowed correlation function **K(v)**, including steps of using the Hermite Transform (**HT**) of two image signals (**f(x), g(y)**) representing shapes defined in respective windows (**W1, W2**) in multi-dimensional images (m-D), wherefrom a step of evaluating the inverse Hermite Transform (**HT**$^{-1}$) is performed to achieve the

computation of said windowed correlation function (**K(v)**), ~~.~~ and

visualizing the correlated shapes and/or processed images.

12. (Currently amended) ~~A medical examination apparatus~~ The system of Claim 1, comprising acquisition means for acquiring medical image data~~, and an image processing system according to one of Claims 1 to 10~~.

13. (Currently amended) A computer program product having a set of instructions stored on a computer readable memory medium, when in use on a general-purpose computer, to cause the computer to perform the steps of: ~~the method according to of Claim 11~~

using a Hermite Transform (**HT**) of two image signals (**f(x)**, **g(y)**) representing shapes defined in respective windows (**W1**, **W2**) in multi-dimensional images (m-D), wherefrom a step of evaluating the inverse Hermite Transform ($\mathbf{HT}^{-1}$) is performed to achieve the computation of a windowed correlation function (**K(v)**), and

visualizing at least one of the correlated shapes and processed images.